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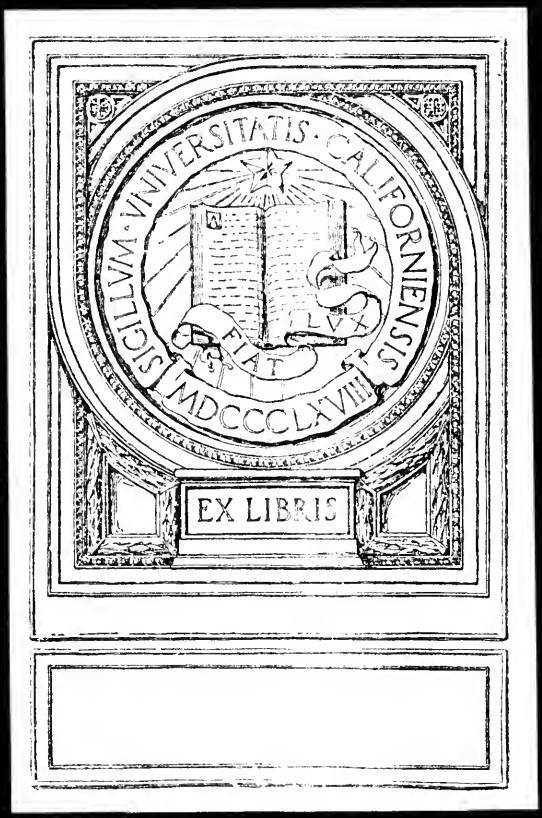
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Ordnance Pamphlet No. 293

12-INCH RANGE TABLE

2,700 F. S. INITIAL VELOCITY TO 22,000 YARDS

LONG POINTED PROJECTILE COEFFICIENT OF FORM .61
WEIGHT OF PROJECTILE, 870 POUNDS

SIACCI'S METHOD

CORRECTED FOR ALTITUDE

INGALLS'S BALLISTIC TABLES

OCTOBER, 1909

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1909

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EXPLANATORY NOTES.

This table is calculated for a temperature of the atmosphere of 59° F., and a barometric pressure of 29.53 inches, the air being assumed to be half saturated. The powder is assumed to give normal velocity when at 90° F.

Ingalls's ballistic tables have been used for computing columns 2, 3, 4, 5, 6, 8, 10, 11, 12, as well as for computing the altitude factor in the ballistic coefficient.

Alger's formulas were used for computing columns 7, 13, 14, 15, 16, 17, 18, 19.

Davis's formula (formula given in Fullam and Hart) was used for computing column 9.

Computations were made for every 500 yards and the columns completed by interpolation.

Columns 1–5, 7, 8 need no explanation.

Column 6 gives the total drift in yards, computed by Mayevski's formula, multiplied by 1.5.

Column 9 gives penetration of Harveyized armor. To get penetration of Krupp armor, multiply figures given by $\frac{8}{10}$.

To get change of range for variation of ± 10 F. S. I. V., multiply figures given by $\frac{1}{5}$.

To get change of range for variation of 1 per cent in density of air, multiply figures given by $\frac{1}{10}$. The density of the air is assumed to be unity at 59° F. and 29.53 inches barometric height. The density of the air for any temperature and barometric height is given in Table II, Alger's exterior ballistics. This column also represents the effect on the range of a variation of ± 10 per cent in the ballistic coefficient, I.V. remaining the same.

Column 11 gives the change of range for a variation of ± 10 pounds in weight of projectile, the charge remaining the same.

For a variation of 1 pound, multiply figures in column 11 by $\frac{1}{10}$.

In columns 13–18, a wind of 24 knots makes twice the effect tabulated.

Column 19 shows how much the point of impact is raised or lowered on a vertical screen by raising or lowering the sight bar 100 yards, the actual range remaining fixed.

The change in range due to a variation of ± 1′ in the angle of departure may be deduced directly from the table.

For a variation of ± 10° F. in temperature of powder, there is caused a corresponding change in the initial velocity of 35 feet per second approximately.

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RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
				2,700				24.3	
100	2.3	2	.11	2,690		100		24.1	7
200	4.7	5	.22	2,681		200		24.0	13
300	7.0	7	.33	2,671		300		23.9	18
400	9.4	10	.44	2,662		400		23.8	22
500	11.7	12	.56	2,652		500		23.7	25
600	14.0	14	.67	2,643		600	1	23.6	28
700	16.4	17	.79	2,633		700	2	23.5	31
800	18.7	19	.90	2,624		800	3	23.4	33
900	21.1	22	1.02	2,615		900	4	23.3	36
1,000	23.4	24	1.13	2,606	0.5	1,000	5	23.2	39
1,100	25.8	27	1.25	2,596	.6	1,100	6	23.1	42
1,200	28.2	29	1.36	2,587	.6	1,200	7	23.0	45
1,300	30.6	32	1.48	2,578	.7	1,300	8	22.9	47
1,400	33.0	34	1.59	2,569	.7	1,400	9	22.8	50
1,500	35.4	37	1.71	2,560	.8	1,500	11	22.7	53

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds.
Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
1			1	1		1	1		
2			1	1		1	1		
3			2	2		2	2		
4			2	2		2	2		
5			3	3		3	3	1	
6			4	4		4	4	1	
6			5	5		5	5	1	
7			5	5		5	5	1	
7			6	6		6	6	1	
8	2		7	7		7	7	2	
9	3		8	8		8	8	2	
9	4		9	9		9	9	2	
10	5		9	9		9	9	2	
10	6		10	10		10	10	2	
11	7		11	11		11	11	3	

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RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
1,500	35.4	37	1.71	2,560	.8	1,500	11	22.7	53
1,600	37.8	40	1.83	2,550	.9	1,600	13	22.6	56
1,700	40.3	42	1.95	2,541	.9	1,700	15	22.5	59
1,800	42.8	45	2.07	2,532	1.0	1,800	17	22.4	61
1,900	45.3	47	2.19	2,523	1.0	1,900	19	22.3	64
2,000	47.8	50	2.31	2,514	1.1	564	21	22.2	67
2,100	50.3	52	2.43	2,505	1.1	527	23	22.1	70
2,200	52.9	55	2.55	2,496	1.2	493	25	22.0	73
2,300	55.4	58	2.67	2,487	1.3	462	27	21.9	76
2,400	58.0	1 01	2.79	2,478	1.4	434	30	21.8	79
2,500	1 00.5	1 04	2.91	2,469	1.5	409	33	21.7	82
2,600	1 03.1	1 07	3.03	2,460	1.6	387	36	21.6	85
2,700	1 05.6	1 10	3.15	2,451	1.7	367	39	21.5	88
2,800	1 08.2	1 13	3.27	2,442	1.8	349	42	21.4	91
2,900	1 10.8	1 16	3.39	2,433	1.9	333	45	21.3	94
3,000	1 13.4	1 19	3.52	2,424	2.0	318	48	21.2	97

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
11	7	.....	11	11	.....	11	11	3	.....
12	8	.....	12	12	.....	12	12	3	.....
12	9	.....	12	13	.....	13	13	3	.....
13	10	.....	13	13	.....	13	13	3	.....
13	11	.....	13	14	.....	14	14	3	.....
14	12	1	14	15	.....	15	15	4	.....
14	13	1	15	16	.....	16	16	4	.....
15	14	1	15	17	.....	17	17	4	.....
15	15	1	16	17	.....	17	17	4	.....
16	16	1	16	18	.....	18	18	4	.....
16	17	2	17	19	1	19	19	5	.....
17	18	2	18	20	1	20	20	5	.....
17	19	2	19	21	1	20	21	5	.....
18	20	2	19	21	1	21	21	5	.....
18	21	2	20	22	1	21	22	6	.....
19	22	3	21	23	1	22	23	6	.....

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RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
3,000	1	13.4	1	19	3.52	2,424	2.0	318	48	21.2	97
3,100	1	16.0	1	22	3.64	2,415	2.1	304	52	21.1	100
3,200	1	18.6	1	25	3.77	2,406	2.3	291	56	21.0	103
3,300	1	21.2	1	28	3.89	2,397	2.4	279	60	20.9	106
3,400	1	23.9	1	31	4.02	2,388	2.6	269	64	20.8	109
3,500	1	26.6	1	34	4.14	2,380	2.7	260	68	20.7	112
3,600	1	29.3	1	37	4.27	2,371	2.9	251	72	20.6	115
3,700	1	32.0	1	40	4.39	2,363	3.0	242	76	20.5	118
3,800	1	34.7	1	43	4.52	2,354	3.2	234	81	20.4	121
3,900	1	37.4	1	46	4.64	2,346	3.4	226	86	20.3	124
4,000	1	40.2	1	50	4.77	2,337	3.6	219	91	20.2	127
4,100	1	43.0	1	53	4.90	2,329	3.8	212	96	20.1	130
4,200	1	45.8	1	57	5.03	2,320	4.0	206	101	20.0	133
4,300	1	48.6	2	00	5.16	2,312	4.2	200	106	19.9	136
4,400	1	51.4	2	04	5.29	2,303	4.5	194	112	19.8	139
4,500	1	54.2	2	07	5.42	2,295	4.7	188	118	19.8	142

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
19	22	3	21	23	1	22	23	6	
20	23	3	22	24	1	23	24	6	
20	24	3	22	25	1	24	25	7	
21	26	3	23	25	1	24	25	7	
21	27	3	23	26	1	25	26	7	
22	28	4	24	27	1	26	27	8	
23	29	4	25	28	1	27	28	8	
23	31	4	25	29	1	28	29	8	
24	32	4	26	30	1	28	30	8	
24	34	4	26	31	1	29	31	8	
25	35	5	27	32	2	30	32	9	
25	37	5	28	33	2	31	33	9	
26	39	5	28	34	2	31	34	10	
26	40	5	29	34	2	32	34	10	
27	42	5	29	35	2	32	35	10	
27	44	6	30	36	3	33	36	11	

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
4,500	1	54.2	2	07	5.42	2,295	4.7	188	118	19.8	142
4,600	1	57.0	2	10	5.55	2,286	5.0	182	124	19.7	145
4,700	1	59.9	2	14	5.68	2,278	5.2	177	130	19.6	148
4,800	2	02.8	2	18	5.81	2,270	5.5	172	136	19.5	151
4,900	2	05.7	2	21	5.95	2,262	5.7	167	142	19.4	154
5,000	2	08.6	2	25	6.08	2,254	6.0	162	149	19.4	157
5,100	2	11.5	2	28	6.22	2,245	6.2	158	156	19.3	160
5,200	2	14.4	2	32	6.35	2,237	6.5	154	163	19.2	163
5,300	2	17.4	2	36	6.49	2,229	6.8	150	170	19.1	166
5,400	2	20.4	2	40	6.62	2,221	7.1	147	177	19.0	169
5,500	2	23.4	2	44	6.76	2,213	7.4	143	184	18.9	172
5,600	2	26.4	2	48	6.89	2,205	7.7	140	191	18.8	175
5,700	2	29.4	2	52	7.03	2,197	8.1	137	199	18.7	178
5,800	2	32.4	2	56	7.17	2,189	8.4	133	207	18.6	180
5,900	2	35.4	3	00	7.31	2,181	8.8	130	215	18.5	183
6,000	2	38.5	3	04	7.45	2,173	9.1	127	223	18.5	186

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
27	44	6	30	36	3	33	36	11	
27	46	6	31	37	3	34	37	11	
28	48	6	31	38	3	35	38	11	
28	51	6	32	39	3	35	39	12	
29	53	6	32	40	3	36	40	12	
29	55	7	33	41	3	37	41	12	
29	57	7	34	42	3	38	42	12	
30	60	7	34	43	4	39	43	13	
30	62	7	35	43	4	39	43	13	
31	65	7	35	44	4	40	44	14	
31	67	8	36	45	4	41	45	14	
31	70	8	37	46	4	42	46	14	
32	72	9	37	47	4	43	47	15	
32	75	9	38	48	4	43	48	15	
33	77	10	38	49	4	44	49	16	
33	80	10	39	50	5	45	50	16	

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RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
6,000	2	38.5	3	04	7.45	2,173	9.1	127	223	18.5	186
6,100	2	41.6	3	08	7.59	2,165	9.5	124	231	18.4	189
6,200	2	44.7	3	12	7.73	2,157	9.8	122	240	18.3	192
6,300	2	47.8	3	16	7.87	2,149	10.2	119	249	18.2	194
6,400	2	50.9	3	20	8.01	2,141	10.6	117	258	18.1	197
6,500	2	54.0	3	24	8.15	2,133	11.0	114	267	18.1	200
6,600	2	57.1	3	28	8.29	2,125	11.4	112	276	18.0	203
6,700	3	00.3	3	32	8.43	2,117	11.9	110	286	17.9	206
6,800	3	03.5	3	36	8.57	2,109	12.3	107	296	17.8	208
6,900	3	06.7	3	40	8.72	2,101	12.8	105	306	17.7	211
7,000	3	09.9	3	45	8.86	2,094	13.2	103	316	17.7	214
7,100	3	13.1	3	49	9.01	2,086	13.7	101	326	17.6	217
7,200	3	16.3	3	54	9.15	2,079	14.1	99	337	17.5	220
7,300	3	19.6	3	58	9.30	2,071	14.6	98	348	17.4	222
7,400	3	22.9	4	03	9.44	2,064	15.1	96	359	17.3	225
7,500	3	26.2	4	07	9.59	2,056	15.6	94	370	17.3	228

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
33	80	10	39	50	5	45	50	16	
33	83	10	40	51	5	46	51	16	
34	86	11	40	52	5	46	52	17	
34	88	11	41	53	5	47	53	17	
35	91	12	41	54	5	47	54	17	
35	94	12	42	55	6	48	55	18	
35	97	12	43	56	6	49	56	18	
35	100	13	43	57	6	50	57	18	
36	102	13	44	58	6	50	58	19	
36	105	14	44	59	6	51	59	19	
36	108	14	45	60	7	52	60	19	
36	111	14	46	61	7	53	61	19	
37	114	15	46	62	7	54	62	20	
37	117	15	47	63	7	54	63	20	
38	120	16	47	64	7	55	64	21	
38	123	16	48	65	8	56	65	21	

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
7,500	3	26.2	4	07	9.59	2,056	15.6	94	370	17.3	228
7,600	3	29.5	4	12	9.73	2,048	16.1	92	381	17.2	231
7,700	3	32.8	4	16	9.88	2,041	16.7	90	393	17.1	233
7,800	3	36.2	4	21	10.03	2,033	17.2	89	405	17.0	236
7,900	3	39.6	4	25	10.18	2,026	17.8	87	417	16.9	238
8,000	3	43.0	4	30	10.33	2,018	18.3	85	429	16.9	241
8,100	3	46.4	4	35	10.48	2,011	18.9	84	442	16.8	244
8,200	3	49.8	4	40	10.63	2,003	19.4	82	455	16.7	246
8,300	3	53.2	4	45	10.78	1,996	20.0	81	468	16.6	249
8,400	3	56.7	4	50	10.93	1,988	20.6	79	481	16.5	251
8,500	4	00.2	4	55	11.09	1,981	21.2	78	494	16.5	254
8,600	4	03.7	5	00	11.24	1,973	21.8	77	508	16.4	256
8,700	4	07.2	5	05	11.40	1,966	22.5	76	522	16.3	259
8,800	4	10.7	5	10	11.55	1,959	23.1	74	536	16.2	261
8,900	4	14.2	5	15	11.71	1,952	23.8	73	550	16.1	264
9,000	4	17.8	5	21	11.86	1,945	24.4	72	565	16.1	266

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
38	123	16	48	65	8	56	65	21	
38	126	16	49	66	8	57	66	21	
38	129	17	49	67	8	58	67	22	
39	133	17	50	68	8	58	68	22	
39	136	18	50	69	8	59	69	23	
39	139	18	51	70	9	60	70	23	
39	142	19	51	71	9	61	71	23	
39	146	19	52	72	9	61	72	24	
39	149	20	52	73	9	62	73	24	
39	153	20	53	74	9	62	74	25	
39	156	21	53	75	10	63	75	25	
39	160	22	54	76	10	64	76	26	
39	164	22	54	77	11	65	77	26	
39	167	23	55	78	11	65	78	27	
39	171	23	55	79	12	66	79	27	
39	175	24	56	80	12	67	80	28	

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RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
9,000	4	17.8	5	21	11.86	1,945	24.4	72	565	16.1	266
9,100	4	21.4	5	26	12.02	1,938	25.1	71	580	16.0	268
9,200	4	25.0	5	31	12.17	1,931	25.7	70	595	15.9	271
9,300	4	28.6	5	36	12.33	1,924	26.4	68	610	15.8	273
9,400	4	32.2	5	42	12.48	1,917	27.1	67	626	15.7	276
9,500	4	35.9	5	47	12.64	1,910	27.8	66	642	15.7	278
9,600	4	39.6	5	53	12.79	1,903	28.6	65	658	15.6	280
9,700	4	43.3	5	58	12.95	1,896	29.3	64	674	15.6	282
9,800	4	47.0	6	04	13.11	1,889	30.1	63	691	15.5	285
9,900	4	50.7	6	09	13.27	1,882	30.8	62	708	15.5	287
10,000	4	54.4	6	15	13.43	1,876	31.6	61	725	15.4	289
10,100	4	58.2	6	20	13.59	1,869	32.4	60	743	15.3	291
10,200	5	02.0	6	26	13.75	1,862	33.2	59	761	15.2	293
10,300	5	05.8	6	32	13.91	1,855	34.0	59	779	15.1	296
10,400	5	09.6	6	38	14.07	1,848	34.8	58	797	15.0	298
10,500	5	13.4	6	44	14.24	1,842	35.6	57	815	15.0	300

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
39	175	24	56	80	12	67	80	28	
39	179	24	57	81	12	68	81	28	
39	183	25	57	82	12	69	82	29	
40	187	25	58	83	12	69	83	29	
40	191	26	58	84	12	70	84	30	
40	195	26	59	85	13	71	85	30	
40	199	27	59	86	13	72	86	30	
40	203	27	60	87	14	73	87	31	
40	208	28	60	88	14	73	88	31	
40	212	28	61	89	15	74	89	32	
40	216	29	61	90	15	75	90	32	
40	220	30	61	91	15	76	91	33	
40	225	30	62	92	16	77	92	33	
40	229	31	62	93	16	77	93	34	
40	234	31	63	94	17	78	94	34	
40	238	32	63	96	17	79	96	35	

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
10,500	5	13.4	6	44	14.24	1,842	35.6	57	815	15.0	300
10,600	5	17.3	6	50	14.40	1,835	36.4	56	834	14.9	302
10,700	5	21.2	6	56	14.57	1,829	37.3	55	853	14.9	304
10,800	5	25.1	7	02	14.73	1,822	38.2	55	873	14.8	307
10,900	5	29.0	7	08	14.90	1,816	39.1	54	893	14.8	309
11,000	5	32.9	7	15	15.06	1,809	40.0	53	913	14.7	311
11,100	5	36.9	7	21	15.23	1,803	40.9	52	934	14.6	313
11,200	5	40.9	7	27	15.39	1,796	41.8	51	955	14.6	315
11,300	5	44.9	7	33	15.56	1,790	42.8	51	976	14.5	317
11,400	5	48.9	7	40	15.73	1,783	43.8	50	997	14.5	319
11,500	5	52.9	7	46	15.90	1,777	44.8	49	1,019	14.4	321
11,600	5	57.0	7	53	16.07	1,770	45.8	48	1,041	14.3	323
11,700	6	01.1	7	59	16.24	1,764	46.8	48	1,064	14.3	325
11,800	6	05.2	8	06	16.41	1,758	47.8	47	1,087	14.2	327
11,900	6	09.3	8	12	16.58	1,752	48.8	47	1,110	14.2	329
12,000	6	13.5	8	19	16.76	1,746	49.9	46	1,133	14.1	331

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
40	238	32	63	96	17	79	96	35	
40	242	33	64	97	17	80	97	36	
40	247	33	64	98	18	80	98	36	
40	251	34	65	99	18	81	99	37	
40	256	34	65	100	19	81	100	37	
40	260	35	66	101	19	82	101	38	
40	265	36	66	102	19	83	102	38	
40	269	36	67	103	19	84	103	39	
40	274	37	67	104	20	84	104	39	
39	278	37	68	105	20	85	105	40	
39	283	38	68	107	20	86	107	40	
39	288	39	68	108	20	87	108	41	
39	292	40	69	109	21	88	109	41	
39	297	40	69	110	21	88	110	42	
39	301	41	70	111	22	89	111	42	
39	306	42	70	113	22	90	113	43	

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
12,000	6	13.5	8	19	16.76	1,746	49.9	46	1,133	14.1	331
12,100	6	17.7	8	25	16.94	1,740	51.0	45	1,157	14.0	333
12,200	6	21.9	8	32	17.11	1,734	52.1	45	1,181	14.0	335
12,300	6	26.1	8	39	17.29	1,728	53.2	44	1,205	13.9	337
12,400	6	30.3	8	46	17.46	1,723	54.3	44	1,230	13.9	339
12,500	6	34.6	8	53	17.64	1,717	55.4	43	1,255	13.8	341
12,600	6	38.9	9	00	17.81	1,711	56.6	42	1,281	13.7	343
12,700	6	43.2	9	07	17.99	1,706	57.8	42	1,307	13.7	345
12,800	6	47.5	9	14	18.17	1,700	59.0	41	1,333	13.6	347
12,900	6	51.8	9	21	18.35	1,695	60.2	41	1,359	13.6	349
13,000	6	56.2	9	29	18.53	1,689	61.4	40	1,386	13.5	351
13,100	7	00.6	9	36	18.71	1,683	62.6	39	1,413	13.4	353
13,200	7	05.0	9	44	18.89	1,678	63.9	39	1,441	13.4	355
13,300	7	09.4	9	51	19.07	1,672	65.2	38	1,469	13.3	357
13,400	7	13.9	9	59	19.25	1,667	66.5	38	1,497	13.3	359
13,500	7	18.4	10	06	19.44	1,661	67.8	38	1,526	13.2	361

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
39	306	42	70	113	22	90	113	43	.....
39	311	43	71	114	22	91	114	44	.....
39	315	44	71	115	23	92	115	44	.....
38	320	44	72	116	23	92	116	45	.....
38	324	45	72	117	24	93	117	45	.....
38	329	46	73	119	24	94	119	46	.....
38	334	47	73	120	24	95	120	47	.....
38	339	48	74	121	25	96	121	48	.....
38	343	48	74	122	25	96	122	48	.....
38	348	49	75	123	26	97	123	49	.....
38	353	50	75	125	26	98	125	50	.....
38	358	51	75	126	27	99	126	51	.....
38	363	51	76	127	27	100	127	51	.....
37	368	52	76	128	28	100	128	52	.....
37	373	52	77	129	28	101	129	52	.....
37	378	53	77	131	29	102	131	53	.....

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
13,500	7	18.4	10	06	19.44	1,661	67.8	38	1,526	13.2	361
13,600	7	22.9	10	14	19.62	1,656	69.1	37	1,555	13.2	363
13,700	7	27.4	10	21	19.81	1,650	70.5	37	1,585	13.1	365
13,800	7	31.9	10	29	19.99	1,645	71.9	36	1,615	13.1	367
13,900	7	36.5	10	36	20.18	1,639	73.3	36	1,645	13.0	369
14,000	7	41.1	10	44	20.36	1,634	74.7	35	1,676	13.0	371
14,100	7	45.7	10	51	20.55	1,629	76.1	34	1,707	12.9	373
14,200	7	50.3	10	59	20.73	1,624	77.6	34	1,739	12.9	375
14,300	7	55.0	11	07	20.92	1,619	79.1	33	1,771	12.8	377
14,400	7	59.7	11	15	21.11	1,614	80.6	33	1,803	12.8	379
14,500	8	04.4	11	23	21.30	1,609	82.1	33	1,836	12.7	381
14,600	8	09.1	11	31	21.49	1,604	83.6	32	1,869	12.6	383
14,700	8	13.9	11	39	21.68	1,600	85.1	32	1,903	12.6	385
14,800	8	18.7	11	47	21.87	1,595	86.7	31	1,937	12.5	387
14,900	8	23.5	11	56	22.06	1,591	88.3	31	1,971	12.5	389
15,000	8	28.3	12	04	22.26	1,586	89.9	31	2,006	12.5	391

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
37	378	53	77	131	29	102	131	53	.....
37	383	54	78	132	29	103	132	54	.....
37	388	55	78	133	30	104	133	54	.....
37	393	55	79	134	30	104	134	55	.....
37	398	56	79	135	31	105	135	55	.....
37	403	57	80	137	31	106	137	56	.....
37	408	58	80	138	31	107	138	57	.....
37	413	59	81	139	32	107	139	58	.....
36	419	59	81	141	32	108	141	58	.....
36	424	60	82	142	33	108	142	59	.....
36	429	61	82	143	33	109	143	60	.....
36	434	62	82	144	34	110	144	61	.....
36	439	63	83	146	34	111	146	62	.....
35	445	63	83	147	35	111	147	62	.....
35	450	64	84	149	35	112	149	63	.....
35	455	65	84	150	36	113	150	64	.....

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. . Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.	Angle of fall.	Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2	3	4	5	6	7	8	9	10
Yards.	° ′	° ′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
15,000	8 28.3	12 04	22.26	1,586	89.9	31	2,006	12.5	391
15,100	8 33.2	12 13	22.45	1,581	91.5	30	2,041	12.4	393
15,200	8 38.1	12 21	22.65	1,577	93.1	30	2,077	12.4	395
15,300	8 43.0	12 30	22.84	1,572	94.8	29	2,113	12.3	397
15,400	8 47.9	12 38	23.04	1,568	96.5	29	2,149	12.3	399
15,500	8 52.8	12 47	23.23	1,563	98.2	29	2,186	12.3	401
15,600	8 57.8	12 55	23.43	1,559	100.0	28	2,223	12.2	403
15,700	9 02.8	13 04	23.62	1,554	101.8	28	2,261	12.1	405
15,800	9 07.8	13 13	23.82	1,550	103.6	27	2,299	12.1	407
15,900	9 12.8	13 22	24.02	1,545	105.4	27	2,337	12.0	409
16,000	9 17.9	13 31	24.22	1,541	107.2	27	2,376	12.0	411
16,100	9 23.0	13 40	24.42	1,537	109.1	26	2,415	11.9	413
16,200	9 28.1	13 49	24.62	1,532	111.0	26	2,455	11.9	415
16,300	9 33.2	13 58	24.82	1,528	112.9	26	2,495	11.8	417
16,400	9 38.3	14 07	25.02	1,523	114.8	26	2,535	11.8	419
16,500	9 43.5	14 16	25.23	1,519	116.7	26	2,576	11.8	421

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
35	455	65	84	150	36	113	150	64	
35	460	66	84	151	37	114	151	65	
35	465	67	85	152	37	115	152	66	
34	471	68	85	154	38	115	154	66	
34	476	69	86	155	38	116	155	67	
34	481	70	86	156	39	117	156	68	
34	486	71	86	157	39	118	157	69	
34	492	72	87	159	40	119	159	70	
33	497	73	87	160	40	119	160	70	
33	503	74	88	162	41	120	162	71	
33	508	75	88	163	41	121	163	72	
33	514	76	88	164	42	122	164	73	
33	519	77	89	166	42	123	166	74	
32	525	78	89	167	43	123	167	74	
32	530	79	90	169	43	124	169	75	
32	536	80	90	170	44	125	170	76	

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
16,500	9	43.5	14	16	25.23	1,519	116.7	26	2,576	11.8	421
16,600	9	48.7	14	25	25.43	1,515	118.7	25	2,617	11.7	423
16,700	9	53.9	14	34	25.64	1,511	120.7	25	2,659	11.7	425
16,800	9	59.1	14	43	25.84	1,507	122.7	25	2,701	11.6	426
16,900	10	04.4	14	53	26.05	1,503	124.7	25	2,744	11.6	428
17,000	10	09.7	15	02	26.25	1,499	126.8	25	2,787	11.6	430
17,100	10	15.0	15	12	26.46	1,495	128.9	24	2,831	11.5	432
17,200	10	20.3	15	21	26.66	1,491	131.0	24	2,875	11.5	434
17,300	10	25.6	15	31	26.87	1,487	133.1	24	2,920	11.4	435
17,400	10	31.0	15	40	27.07	1,483	135.3	24	2,965	11.4	437
17,500	10	36.4	15	50	27.28	1,479	137.5	24	3,010	11.4	439
17,600	10	41.8	16	00	27.48	1,475	139.7	23	3,056	11.3	441
17,700	10	47.2	16	09	27.69	1,471	142.0	23	3,103	11.3	442
17,800	10	52.6	16	19	27.90	1,467	144.3	23	3,150	11.3	444
17,900	10	58.0	16	28	28.11	1,464	146.6	23	3,198	11.2	445
18,000	11	03.5	16	38	28.32	1,460	149.0	23	3,246	11.2	447

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
32	536	80	90	170	44	125	170	76	.....
32	542	81	90	171	45	126	171	77	.....
32	547	82	91	173	45	127	173	78	.....
31	553	82	91	174	46	127	174	78	.....
31	558	83	92	176	46	128	176	79	.....
31	564	84	92	177	47	129	177	80	.....
31	570	85	93	178	48	130	178	81	.....
31	575	86	93	180	48	131	180	82	.....
30	581	87	94	181	49	131	181	83	.....
30	586	88	94	183	49	132	183	84	.....
30	592	89	95	184	50	133	184	85	.....
30	598	90	95	185	51	134	185	86	.....
29	603	91	96	187	51	135	187	87	.....
29	609	92	96	188	52	135	188	87	.....
28	614	93	97	190	52	136	190	88	.....
28	620	94	97	191	53	137	191	89	.....

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
18,000	11	03.5	16	38	28.32	1,460	149.0	23	3,246	11.2	447
18,100	11	09.0	16	48	28.53	1,457	151.4	22	3,295	11.2	449
18,200	11	14.5	16	58	28.74	1,453	153.8	22	3,345	11.1	450
18,300	11	20.0	17	08	28.95	1,450	156.2	22	3,395	11.1	452
18,400	11	25.5	17	18	29.17	1,446	158.7	22	3,445	11.1	453
18,500	11	31.1	17	28	29.38	1,443	161.2	22	3,496	11.1	455
18,600	11	36.7	17	38	29.60	1,439	163.7	21	3,547	11.0	457
18,700	11	42.3	17	48	29.81	1,436	166.3	21	3,599	11.0	458
18,800	11	48.0	17	58	30.03	1,433	168.9	21	3,652	10.9	460
18,900	11	53.7	18	08	30.24	1,430	171.5	21	3,706	10.9	461
19,000	11	59.4	18	18	30.46	1,427	174.1	21	3,760	10.9	463
19,100	12	05.1	18	28	30.67	1,424	176.8	20	3,815	10.8	465
19,200	12	10.8	18	39	30.89	1,421	179.5	20	3,870	10.8	466
19,300	12	16.6	18	49	31.11	1,418	182.2	20	3,926	10.8	468
19,400	12	22.4	19	00	31.33	1,416	185.0	20	3,982	10.8	469
19,500	12	28.2	19	10	31.55	1,413	187.8	20	4,038	10.8	471

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire, speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
28	620	94	97	191	53	137	191	89	
28	626	95	97	192	54	138	192	90	
28	631	96	98	194	54	139	194	91	
27	637	97	98	195	55	139	195	92	
27	642	98	99	197	55	140	197	93	
27	648	99	99	198	56	141	198	94	
27	654	100	99	199	57	142	199	95	
26	659	101	100	201	57	143	201	96	
26	665	102	100	202	58	143	202	97	
25	670	103	101	204	58	144	204	98	
25	676	104	101	205	59	145	205	99	
25	682	105	101	207	60	146	207	100	
25	688	106	102	208	61	147	208	101	
24	693	107	102	210	61	147	210	102	
24	699	108	103	211	62	148	211	103	
24	705	110	103	213	63	149	213	104	

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
19,500	12	28.2	19	10	31.55	1,413	187.8	20	4,038	10.8	471
19,600	12	34.0	19	20	31.77	1,410	190.7	19	4,095	10.7	473
19,700	12	39.8	19	31	31.99	1,408	193.6	19	4,153	10.7	474
19,800	12	45.7	19	41	32.21	1,405	196.5	19	4,211	10.7	476
19,900	12	51.6	19	52	32.43	1,403	199.4	19	4,270	10.7	477
20,000	12	57.5	20	02	32.66	1,400	202.4	19	4,330	10.7	479
20,100	13	03.4	20	12	32.88	1,398	205.4	18	4,390	10.6	481
20,200	13	09.3	20	23	33.11	1,395	208.5	18	4,451	10.6	482
20,300	13	15.3	20	34	33.33	1,393	211.6	18	4,512	10.6	484
20,400	13	21.3	20	45	33.56	1,390	214.7	18	4,574	10.6	485
20,500	13	27.3	20	56	33.78	1,388	217.8	18	4,636	10.6	487
20,600	13	33.3	21	06	34.01	1,385	221.0	17	4,699	10.5	489
20,700	13	39.4	21	17	34.23	1,383	224.2	17	4,763	10.5	490
20,800	13	45.5	21	28	34.46	1,381	227.5	17	4,827	10.5	492
20,900	13	51.6	21	39	34.68	1,379	230.8	17	4,991	10.5	493
21,000	13	57.7	21	50	34.91	1,377	234.2	17	4,956	10.5	495

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
24	705	110	103	213	63	149	213	104	
24	711	111	103	214	64	150	214	105	
24	717	112	104	216	64	151	216	106	
23	722	113	104	217	65	152	217	107	
23	728	114	105	219	65	153	219	108	
23	734	115	105	220	66	154	220	109	
23	740	116	105	222	67	155	222	110	
23	746	117	106	223	67	156	223	111	
22	751	118	106	225	68	156	225	112	
22	757	119	107	226	68	157	226	113	
22	763	121	107	228	69	158	228	114	
22	769	122	107	229	70	159	229	115	
21	775	123	108	231	71	160	231	116	
21	780	124	108	232	71	160	232	117	
20	786	125	109	234	72	161	234	118	
20	792	127	109	235	73	162	235	120	

RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Range.	Angle of departure = angle of elevation plus jump.		Angle of fall.		Time of flight.	Striking velocity.	Drift.	Danger space for a target 20 feet high.	Maximum ordinate.	Penetration of harveyized armor with capped projectiles.	Change of range for variation of ± 50 foot-seconds initial velocity.
1	2		3		4	5	6	7	8	9	10
Yards.	°	′	°	′	*Seconds.*	*Foot-seconds.*	*Yards.*	*Yards.*	*Feet.*	*Inches.*	*Yards.*
21,000	13	57.7	21	50	34.91	1,377	234.2	17	4,956	10.5	495
21,100	14	03.8	22	00	35.14	1,375	237.6	16	5,022	10.4	497
21,200	14	10.0	22	11	35.37	1,373	241.0	16	5,088	10.4	498
21,300	14	16.2	22	22	35.60	1,371	244.5	16	5,155	10.4	500
21,400	14	22.4	22	33	35.83	1,369	248.0	16	5,222	10.4	501
21,500	14	28.6	22	44	36.06	1,367	251.5	16	5,290	10.4	503
21,600	14	34.8	22	55	36.29	1,365	255.1	15	5,359	10.3	505
21,700	14	41.1	23	06	36.52	1,363	258.7	15	5,428	10.3	506
21,800	14	47.4	23	17	36.75	1,361	262.4	15	5,498	10.3	508
21,900	14	53.7	23	28	36.98	1,360	266.1	15	5,568	10.3	509
22,000	15	00.0	23	39	37.21	1,359	269.8	15	5,638	10.3	511

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RANGE TABLE FOR 12-INCH GUN.

Weight of projectile for which this table is calculated, 870 pounds. Initial velocity, 2,700 foot-seconds. Coefficient of form = .61.

Change of range for variation of ± 10 pounds in weight of projectile.	Change of range for variation of density of air of ± 10 per cent.	Change of range for wind component in plane of fire of 12 knots.	Change of range for motion of gun in plane of fire of 12 knots.	Change of range for motion of target in plane of fire of 12 knots.	Deviation for lateral wind component of 12 knots.	Deviation for lateral motion of gun perpendicular to line of fire, speed of 12 knots.	Deviation for lateral motion of target perpendicular to line of fire. speed of 12 knots.	Change in height of impact for variation of ± 100 yards in sight bar.	
11	12	13	14	15	16	17	18	19	20
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Feet.*	
20	792	127	109	235	73	162	235	120	.....
20	798	128	109	237	74	163	237	121	.....
19	804	129	110	238	74	164	238	122	.....
19	809	130	110	240	75	164	240	123	.....
18	815	131	111	241	75	165	241	124	.....
18	821	133	111	243	76	166	243	125	.....
18	827	134	111	245	77	167	245	126	.....
17	833	135	112	246	78	168	246	127	.....
17	838	136	112	248	78	168	248	128	.....
16	844	137	113	249	79	169	249	129	.....
16	850	139	113	251	80	170	251	131	.....

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